Brain Fitness Resources

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Recommendations for Parents, Schools and Disability Organizations Regarding Brain Training Programs

Parents should ask:

- Do you have peer-reviewed research and random controlled studies regarding your program(s) that demonstrate that the program improves children's academic performance?
- How enduring are the results of your brain training? Do you have one year post study data>?
- Will my child's gains be reflected in improved school work, attention, reading, etc.? (Will improvements transfer or generalize into real life?)
- Are claims of successful outcomes based primarily on testimonials?
- Who administers the cognitive testing? ("Graduate-level training in cognitive ability assessment and a background in diagnostic decision-making are requisite.") http://www.riversidepublishing.com/products/wjIIIAchievement/pdf/CogQuals.pdf
- Are alternative versions of the testing instruments administered for pre and post-testing to avoid practice effects? ("Practice Effects refer to gains in scores on cognitive tests that occur when a person is retested on the same instrument, or tested more than once on very similar ones. These gains are due to the experience of having taken the test previously…and they do not reflect growth or other improvement on the skills being assessed.") Kaufman, A.S. (2003) Practice Effects. http://www.speechandlanguage.com/clinical-cafe/practice-effects
- Is progress measured on academic skills (e.g., basic reading, reading comprehension, reading fluency, math) with standardized achievement tests with the results reported in standard scores? (Standard scores are a more accurate representation of an examinee's ability because they are based not only on the mean at a given age level but also on the distribution of scores. Standard scores also can be arithmetically compared and summarized. http://www.pearsonassessments.com/pai/ca/RelatedInfo/InterpretationAgeGradeEquivalents.htm)
- In addition to its brain training program, does the brain training provider explain the importance of the "4 Pillars of Brain Health" (diet, exercise, stress management, mental stimulation)? http://www.sharpbrains.com/resources/2-the-4-pillars-of-brain-maintenance/why-a-brain-healthy-lifestyle-is-so-

important/ "Mental stimulation" needs to include a major emphasis on early research-based reading intervention. (See: http://www.childrenofthecode.org/Tour/c1/academicdanger.htm.)

- Does the provider have a professional advisory board? Are members of this board affiliated with universities or does the board consist primarily of providers of brain training programs that could constitute a conflict of interest?
- Are there any guarantees associated with your program (e.g., two years growth)?
- What is the cost of the recommended program?

Brain Fitness/Training Website Questions

- Does the site include names and professional credentials of staff who test and train children? (e.g., degree in education or psychology)
- Does the site point out the cognitive benefits of lifestyle improvements (e.g., diet, exercise, stress management)
- Does the site include or link to peer-reviewed research and random controlled studies regarding their brain training program(s)?
- Are scientists (ideally neuropsychologists) and a scientific advisory board behind the program and listed on website? http://www.sharpbrains.com/wp-content/uploads/2007/05/sharpbrains_checklist.pdf

Recommendations for schools and disability organizations

- Teachers and principals who select speakers for professional development activities should ask speakers for the sources of their conclusions in the form of research evidence in peer-reviewed journals. They should ask speakers for bibliographies of the research evidence published on the practices recommended in their presentations. (Stanovich 2003, p. 11)
- Ask: Have you provided presentations regarding your program at other professional and disability organization conferences? If so, when? Is a copy of your presentation available?
- Disability organizations who are considering brain training providers for board or professional advisory board positions should request a vita, potential conflicts of interests, and research evidence regarding the efficacy of their programs.

- For brain training providers asking to advertise in publications of disability organizations, they should be required to provide research evidence in peer-reviewed journals regarding the programs they wish to advertise.

- Ask: Have you displayed your program as a vendor in the exhibit halls at state, national and/or international professional and disability organization conferences? Names of organizations _____

- Request titles of presentations at disability organization conferences and dates of presentations

Legal Requirements for Schools

- No Child Left Behind (NCLB) "requires comprehensive reform programs that "employ proven strategies and proven methods for student learning, teaching, and school management that are based on scientifically based research and effective practices and have been replicated successfully in schools." "Scientifically based research & the Comprehensive School Reform (CSR) Program" http://www2.ed.gov/programs/compreform/guidance/appendc.pdf

- IDEA 2004: "School districts must ensure that scientifically based research drives their professional development activities and services. (34 C.F.R. § 300.226(b)(1)) The full definition of the term "scientifically based research" includes that a peer-reviewed journal published the research, or that a panel of independent experts through a comparably rigorous, objective, and scientific review approved it." http://www.wrightslaw.com/howey/iep.special.factors.htm

Strategies for Parents and Advocates:
Verifying Working Memory and Brain Training Claims

Examples: A WM/brain training provider may say	A parent/advocate/educator might respond	Research Conclusions and/or Recommendations
"A growing body of scientific research documents the science behind our programs as well as the results of our training." "in a one-year follow-up study, about 98.7% of the skills trained were equal or greater than at the completion of the training."	May I see a peer-reviewed study regarding your program? Has this study been replicated? (Scholarly peer review is the process of subjecting an author's…research or ideas to the scrutiny of others who are experts in the same field, before a paper describing this work is published in a journal. http://en.wikipedia.org/wiki/Peer_review)	"Have findings supporting this method been published in recognized scientific journals that use some type of peer review procedure? The answer to this question will almost always separate pseudoscientific claims from the real thing…."Science does not accept findings that have failed the tests of replication and peer review precisely because it wants to ensure that all findings in science are in the public domain…" Using Research and Reason in Education: How Teachers Can Use Scientifically Based Research to Make Curricular and Instructional Decisions (Stanovich 2003) http://lincs.ed.gov/publications/pdf/Stanovich_Color.pdf "…providers of commercial products are not subject to peer review and can thus present results selectively…" (Reply: Shipstead Sept 2012)
In 3-6 months, students… average more than 3.6-year gains in cognitive skills! Gains in reading skills are even greater-exceeding 4 years.	Do you have peer-reviewed evidence of this? Can you provide the results in standard scores?	Interpretation Problems of Age and Grade Equivalents: "… problems associated with age and grade equivalents… seriously limit their reliability and validity." http://www.pearsonassessments.com/pai/ca/RelatedInfo/InterpretationAgeGradeEquivalents.htm
On our website, you can find many testimonials from parents regarding results of our brain training program.	May I see a peer-reviewed study of your training results? Has it been replicated?	"Treatments with efficacy based solely on clinical observations, uncontrolled studies, or anecdotes (testimonials) are not empirically validated and it is unprofessional and unethical to disseminate them." Pennington, B.F. (2011) Controversial Therapies for Dyslexia. *Perspectives on Language and Learning*, 37 (1), 7-8. http://www.onlinedigeditions.com/display_article.php?id=625317
Your child made amazing gains on the posttest.	Was the same test used for both pre- and post-testing? How much time elapsed between the pre-test and posttent?	*"Practice effects* refer to gains in scores on cognitive tests that occur when a person is retested on the same instrument (rather than an alternate form)… These gains… do not reflect growth or other improvement on the skills being assessed." http://www.speechandlanguage.com/clinical-cafe/practice-effects "…organizations may be able to minimize practice effects due to memory by using a

		minimum retest interval of at least one year." Retesting in Selection: A Meta-Analysis of Practice Effects for Tests of Cognitive Ability http://free.ebooks6.com/Retesting-in-Selection-A-Meta-Analysis-of-Practice-Effects-for-download-w45499.pdf
Brain training will make your child smarter. "The average gain on I.Q. is 15 points after 24 weeks of training, and 20 points in less than 32 weeks." "…we conclude that it is possible to improve Gf (fluid intelligence)…." (Jaeggi 2008)	May I see a peer-reviewed study of your training results? Has it been replicated? It's my understanding that reading a lot increases crystallized intelligence. What research-based reading program does my child use?	"We replicate a study that claims to improve intelligence by training working memory. …results from the current study did not suggest any significant improvement in the mental abilities tested, especially fluid intelligence and working memory capacity." Working memory training does not improve intellectual ability. (Chooi & Thompson, Intelligence Nov-Dec, 2012) http://www.gwern.net/docs/2012-chooi.pdf No Evidence of Intelligence Improvement After Working Memory Training: A Randomized, Placebo-Controlled Study. (Redick, et.al. June 2012 http://psycnet.apa.org/index.cfm?fa=buy.optionToBuy&id=2012-16236-001 "Those who read a lot will enhance their verbal intelligence; that is, reading will make them smarter!" (What Reading Does for the Mind, Cunningham and Stanovich (2001) http://www.csun.edu/~krowlands/Content/Academic_Resources/Reading/Useful%20Articles/Cunningham-What%20Reading%20Does%20for%20the%20Mind.pdf "…crystallized intelligence is just massively built by reading itself. Dr. Keith Stanovich: Matthew Effects - Does Reading Make you Smarter? http://www.childrenofthecode.org/interviews/stanovich.htm
"Increasing working memory capacity and focus will improve academic performance for any child."	Can you provide research evidence that your training transfers (generalizes) to a child's academic performance (e.g., reading, math)?	We would like to underscore … the need to establish whether the training methods that have been developed really do have the potential to deliver educationally significant gains in academic progress. (Susan E. Gathercole, Darren L. Dunning, Joni Holmes, Sept 2012 http://www.sciencedirect.com/science/article/pii/S2211368112000733 "… one finds that there have been few studies to utilize academic outcome measures…it is imperative that more data on reading and math outcomes be published before they are included in this analysis." (*Cogmed Published Research Meta-Analysis Version 1.3*, Pearson, p. 38, http://www.cogmed.com.au/pdfs/CogmedResearchClaimsEvidence.pdf) "…there is no evidence that working memory training produces generalized gains to the other skills that have been investigated (verbal ability, word decoding, or arithmetic)..." Melby-Lervåg, M., & Hulme, C., 2012, May 21). http://www.apa.org/pubs/journals/releases/dev-ofp-melby-lervag.pdf
Schools should provide working	Schools are required by federal law to use research based	"The most accurate description of the state of WM training is that the fundamental

memory training to students.	interventions.	techniques remain a work in progress. (Reply: Shipstead, et.al. Sept 2012, p. 217) "By requiring the child's IEP to include 'a statement of special education…based on peer reviewed research …, Congress clarified that ***IEPs must include research-based methodology***….IDEA 2004 creates new ***requirements for schools to use scientific research based instructional practices*** and interventions that are based on accepted, peer-reviewed research…." http://www.wrightslaw.com/idea/art/10.tips.steedman.htm#3

The availability of detailed contrary opinions allows for informed purchasing decisions, rather than decisions which are based on heuristics such as appeal to authority (e.g., "hundreds of experts . . . are embracing working memory training" http://www.sciencedirect.com/science/article/pii/S2211368112000629

: working memory can be improved by training & such training helps people with attention deficits & it improves reasoning ability overall." Klingberg

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